Tracking control for an autonomous underwater vehicle based on multiplicative potential energy function

Abstract

This paper presents a new adaptive region boundary-based tracking control for an Autonomous Underwater Vehicle (AUV). The proposed controller enables an AUV to track a moving target formed by the union of two or more boundaries. In this case, multiplicative potential energy function is used to unite the entire boundaries. The AUV also navigates into a specific position on the boundary lines or surfaces while the target itself is moving. A Lyapunov-like function is presented for convergence analysis of the AUV. Simulation results on AUV with 6 degrees-of-freedom are presented to illustrate the performance of the proposed controller.